OIPE JC177
JAN 1 3 2004
PATENT & TRADEMARK OFFICE

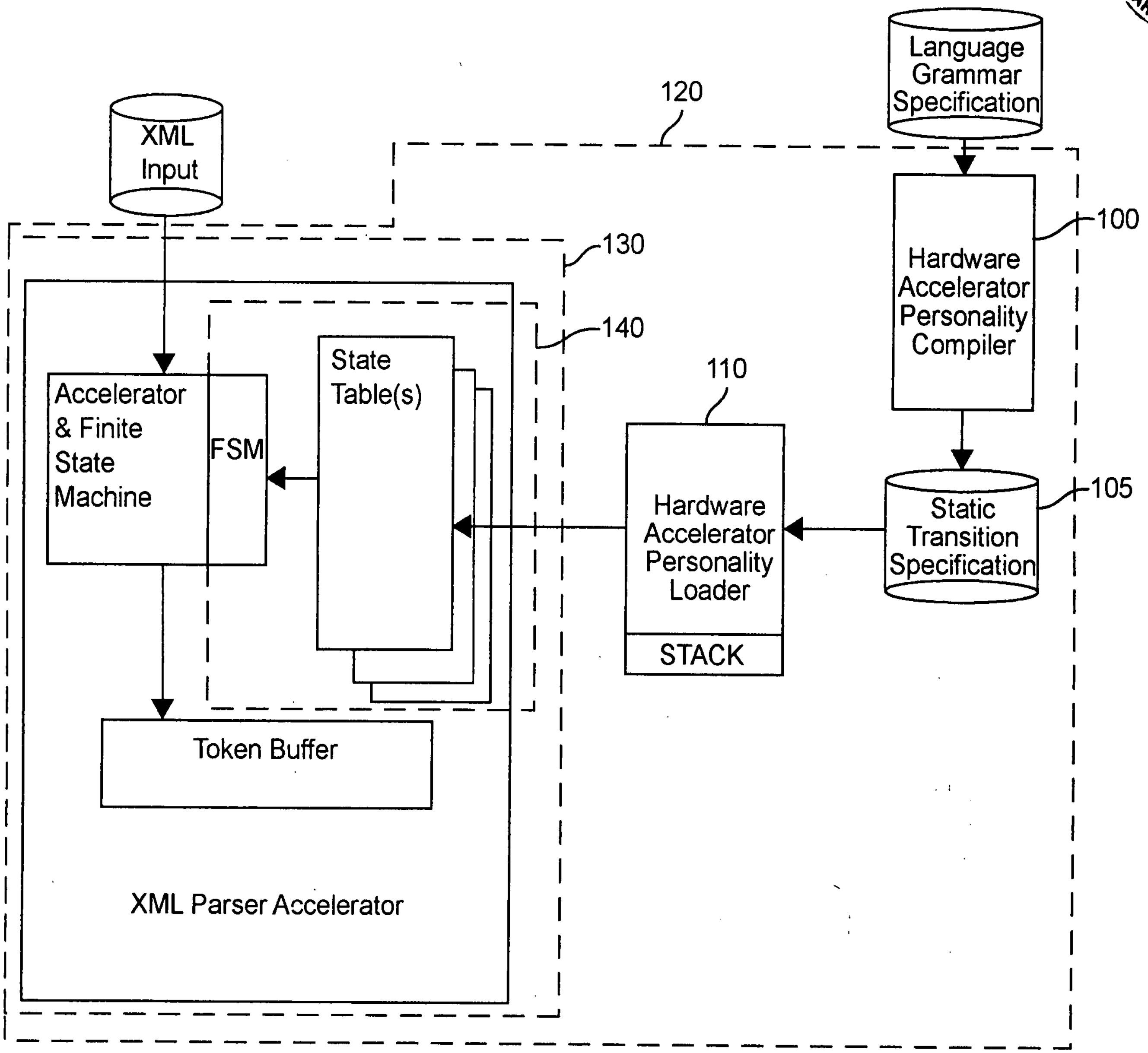
XML Input
Language Grammar Specification
120
100
Hardware Accelerator Personality Compiler
130
140
110
Accelerator & Finite State Machine
FSM
State Table(s)
Hardware Accelerator Personality Loader
STACK
Static Transition Specification
105
Token Buffer
XML Parser Accelerator

Figure 1

XML Parser State Table Example

ASCII Value

Index → Base Address ↓	00	01	02	03	....	FD	FE	FF
State 0	Stay in State 0	Stay in State 0	Go To State 1	Stay in State 0	....	Stay in State 0, Special Interrupt	Stay in State 0	Stay in State 0
State 1	Stay in State 1	Go To State 2	Go To State 0	Stay in State 1	....	Go To State 4	Go To State 0	Go To State 0
State 2	Stay in State 2	Go To State 3	Go To State 0	Go To State 3, Special Interrupt	....	Go To State 0	Go To State 0	Go To State 0
State 3	Stay in State 3	Go To State 0	Go To State 0, Store Token	Go To State 0	....	Go To State 0	Go To State 0	Go To State 0
State 4	Stay in State 4	Go To State 0, Store Token	Go To State 0	Go To State 0	....	Go To State 0	Go To State 5	Go To State 0
State 5	Stay in State 5	Go To State 0	Go To State 0	Go To State 0	....	Go To State 0	Go To State 0	Go To State 0, Store Token

Figure 2A

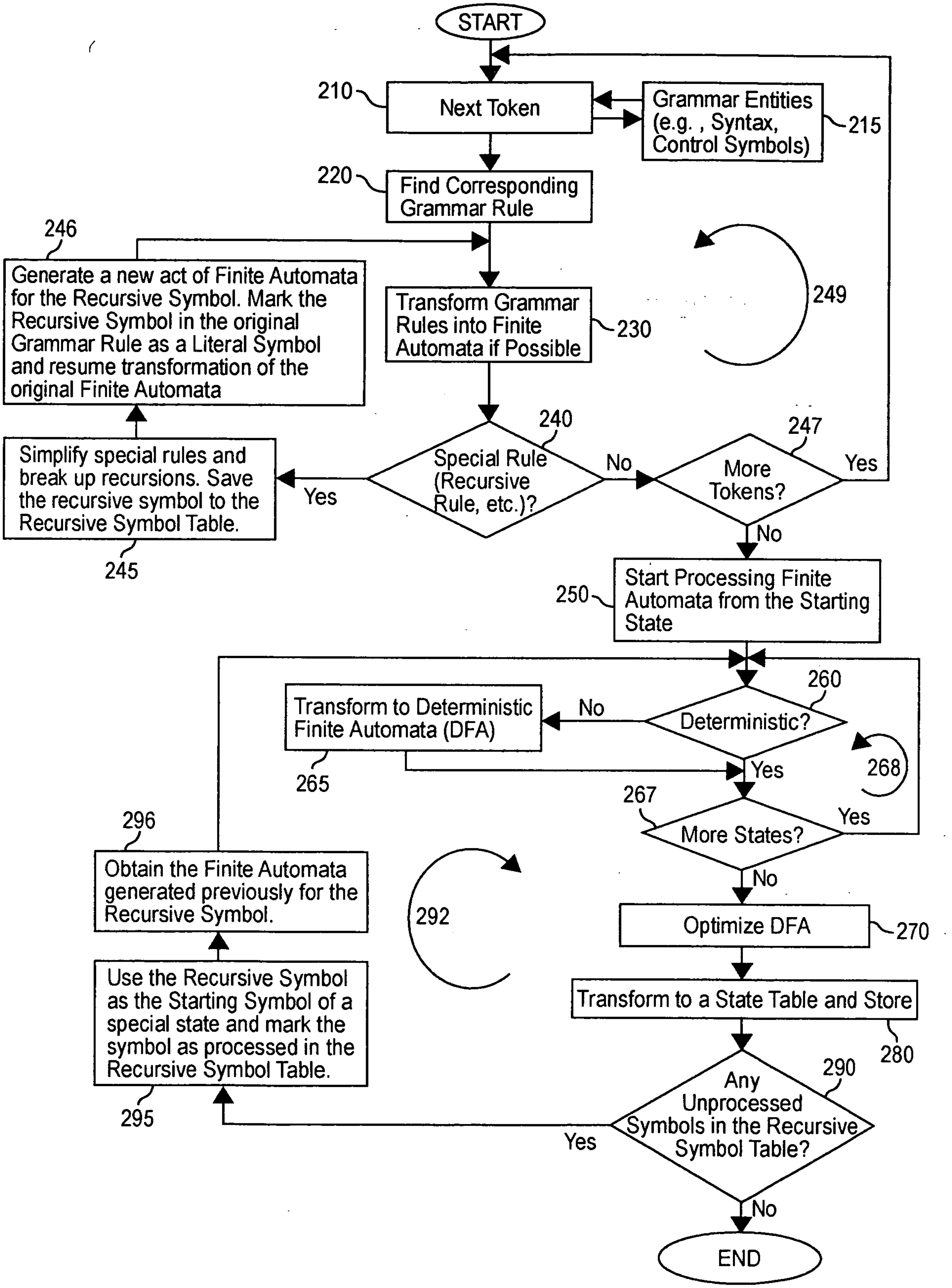
START
210
Next Token
Grammar Entities (e.g. , Syntax, Control Symbols)
215
220
Find Corresponding Grammar Rule
246
Generate a new act of Finite Automata for the Recursive Symbol. Mark the Recursive Symbol in the original Grammar Rule as a Literal Symbol and resume transformation of the original Finite Automata
Transform Grammar Rules into Finite Automata if Possible
230
249
Simplify special rules and break up recursions. Save the recursive symbol to the Recursive Symbol Table.
240
Special Rule (Recursive Rule, etc.)?
Yes
No
247
More Tokens?
Yes
No
245
250
Start Processing Finite Automata from the Starting State
260
Transform to Deterministic Finite Automata (DFA)
No
Deterministic?
Yes
268
265
267
More States?
Yes
No
296
Obtain the Finite Automata generated previously for the Recursive Symbol.
292
Optimize DFA
270
Use the Recursive Symbol as the Starting Symbol of a special state and mark the symbol as processed in the Recursive Symbol Table.
Transform to a State Table and Store
280
290
Any Unprocessed Symbols in the Recursive Symbol Table?
295
Yes
No
END

Figure 2B

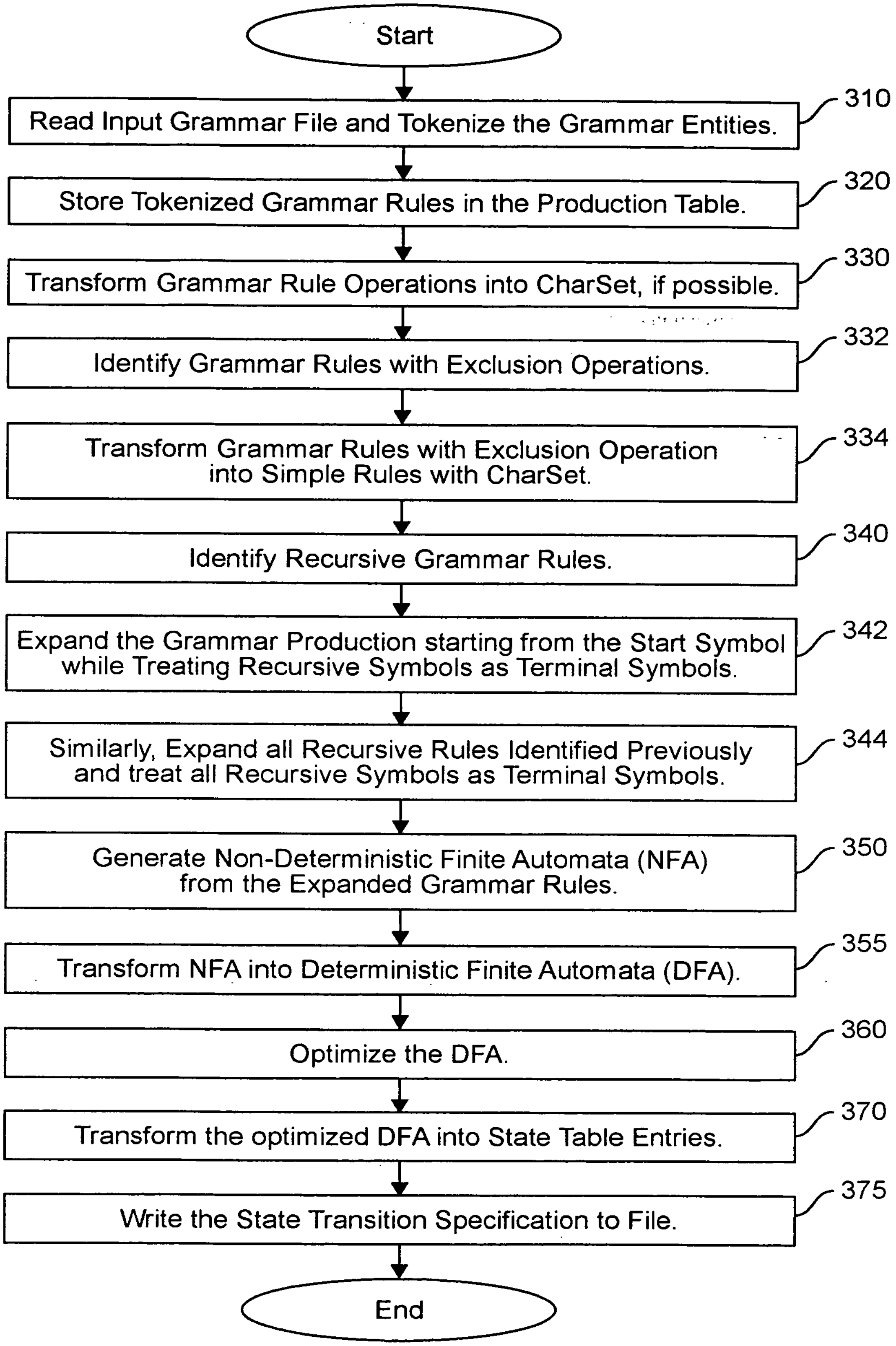
Start
Read Input Grammar File and Tokenize the Grammar Entities.
310
Store Tokenized Grammar Rules in the Production Table.
320
Transform Grammar Rule Operations into CharSet, if possible.
330
Identify Grammar Rules with Exclusion Operations.
332
Transform Grammar Rules with Exclusion Operation into Simple Rules with CharSet.
334
Identify Recursive Grammar Rules.
340
Expand the Grammar Production starting from the Start Symbol while Treating Recursive Symbols as Terminal Symbols.
342
Similarly, Expand all Recursive Rules Identified Previously and treat all Recursive Symbols as Terminal Symbols.
344
Generate Non-Deterministic Finite Automata (NFA) from the Expanded Grammar Rules.
350
Transform NFA into Deterministic Finite Automata (DFA).
355
Optimize the DFA.
360
Transform the optimized DFA into State Table Entries.
370
Write the State Transition Specification to File.
375
End

Figure 3

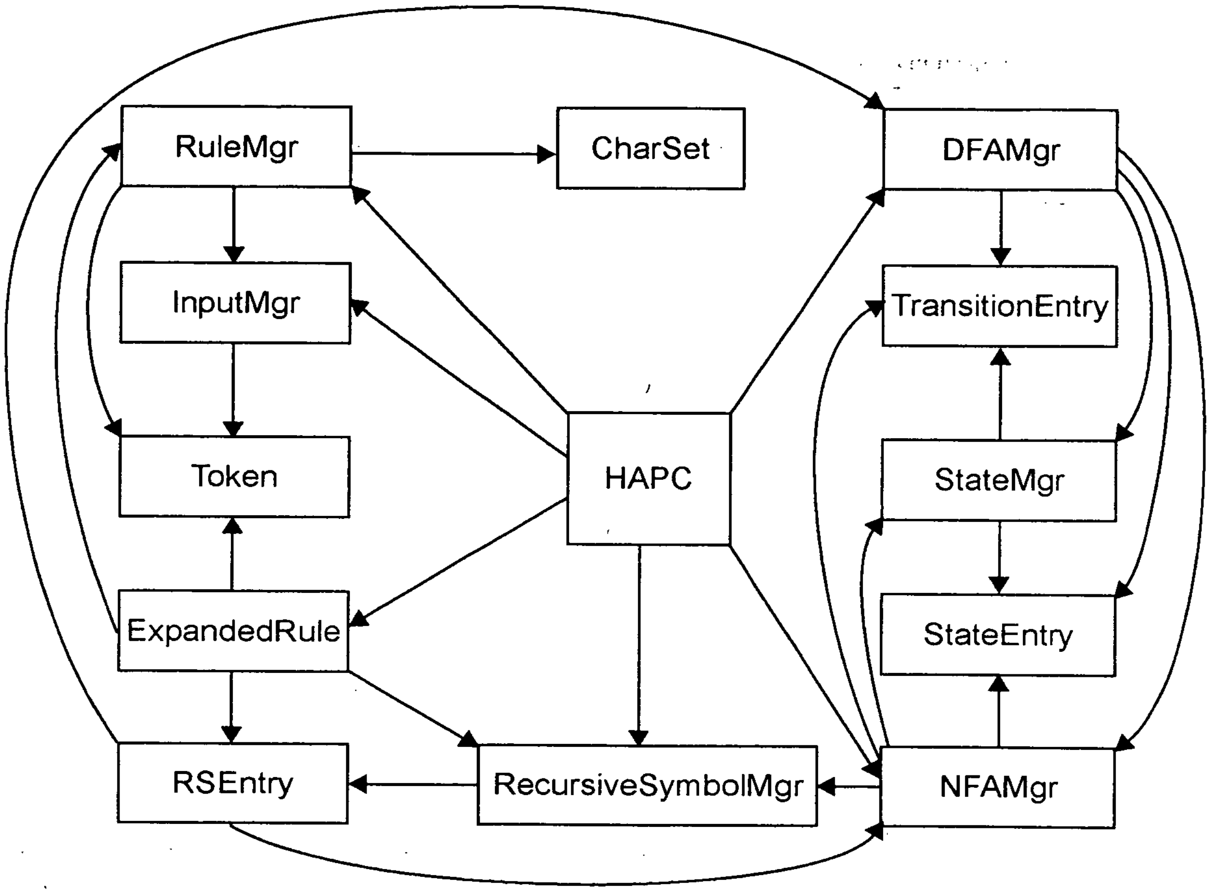
RuleMgr
CharSet
DFAMgr
InputMgr
TransitionEntry
Token
HAPC
StateMgr
ExpandedRule
StateEntry
RSEntry
RecursiveSymbolMgr
NFAMgr

Figure 4

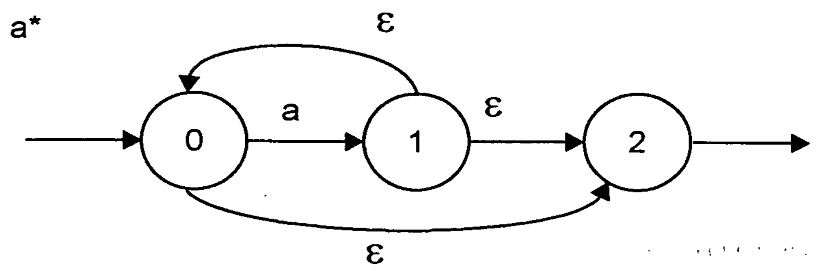

Figure 5A

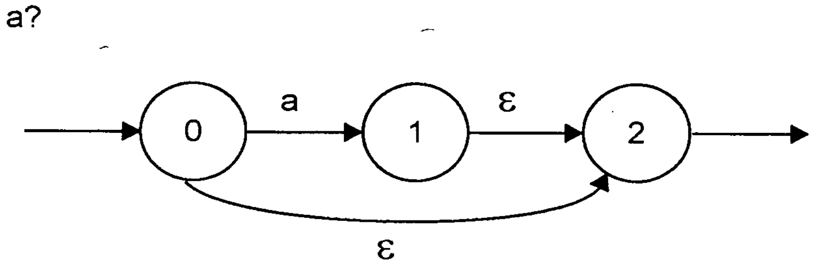

Figure 5B

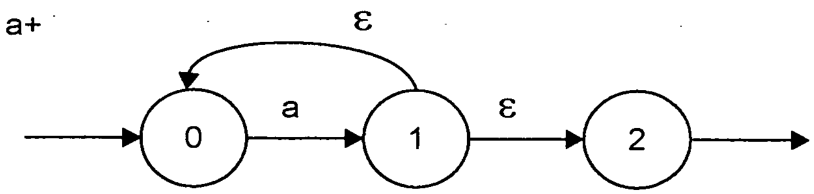

Figure 5C

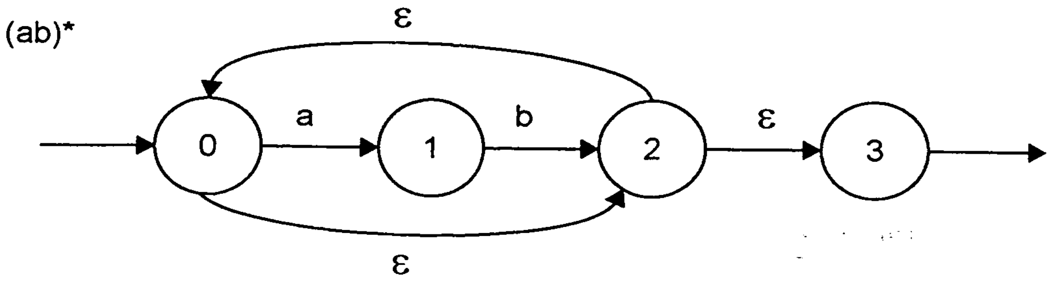

Figure 5D

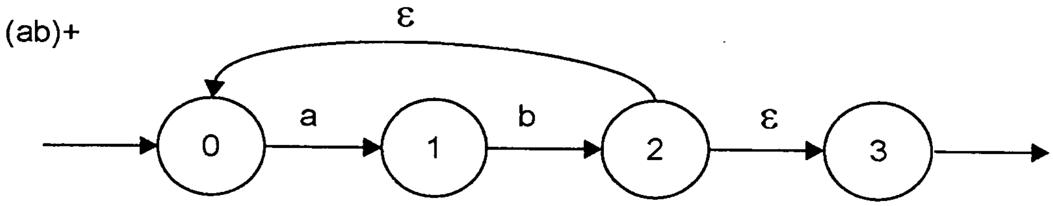

Figure 5E

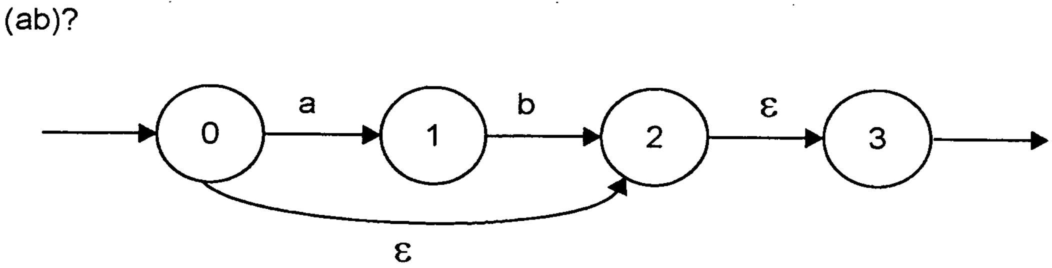

Figure 5F

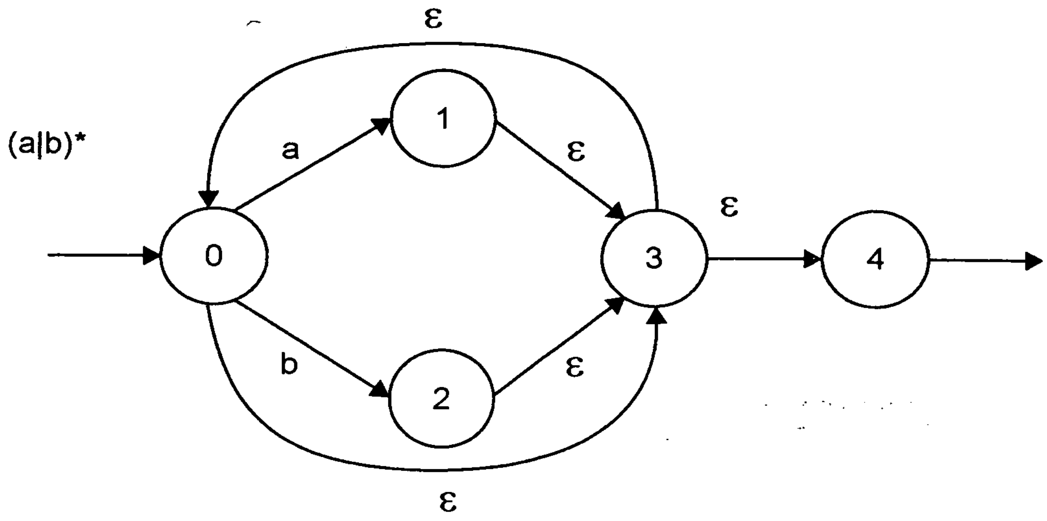

Figure 5G

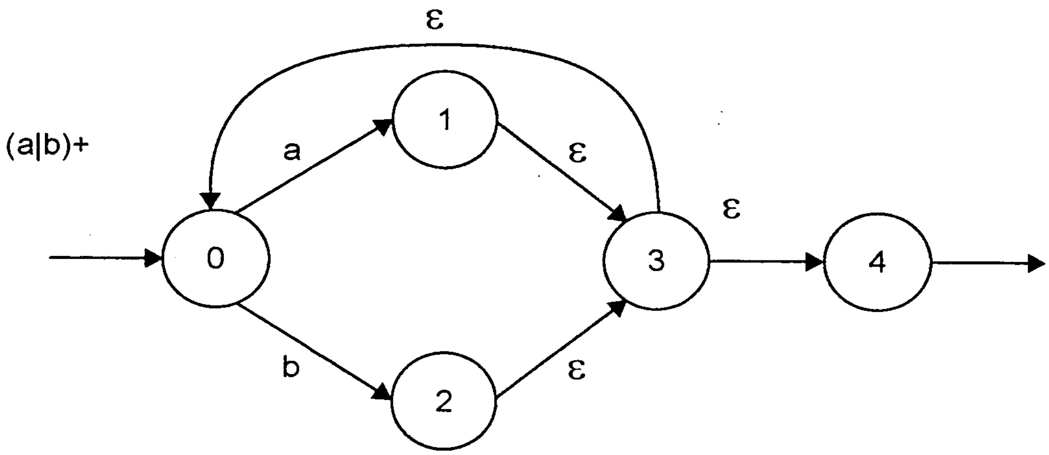

Figure 5H

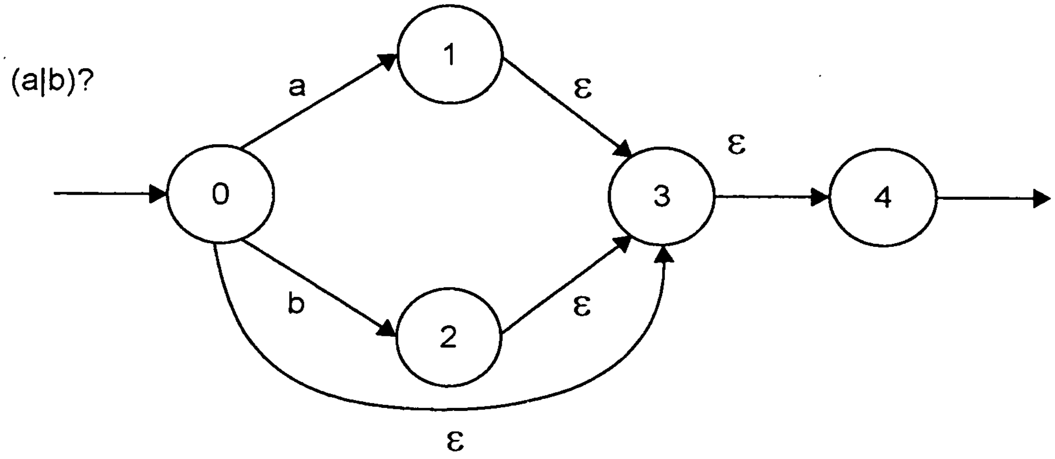

Figure 5I

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                           </TableNames>
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                             •
                             •
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       (621)                  <TransitionCount>2</TransitionCount>
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Figure 6A

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                  </Transition>
                  <Transition>
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          626        <AllowableInputCount>4</AllowableInputCount>
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      621            </Input>
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620                  </Input>
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                 •
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                        •
                        •
               </StateTable>
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             </StateTransitionSpecification>
            </HAPC>
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Figure 6B